

REMARKS

Claim 1 has been amended to correct a typographic error. Because this change is formal in nature, it is respectfully submitted that it does not raise new issues and entry of the amendment is respectfully requested. The claims are otherwise unchanged.

The rejection of claims 1-4 and 7 under 35 §103(a) as being unpatentable over U.S. Patent Nos. 5,589,086 (Sawada) and 6,643,560 (Shimomura) is respectfully traversed on the grounds that neither the Sawada patent nor the Shimomura patent, whether considered individually or in any reasonable combination:

- a method and device for controlling an electrical discharge machine in which multiple, pre-stored, discharge servo curves may be retrieved and swapped in real-time during a cutting procedure, and therefore *account for changes that might occur in the cutting conditions*, such as changes in the material of the workpiece, as recited in independent claims 1 and 7;
- construction of the pre-stored curves based on input gap-voltage deviations and cutting speed records obtained by running the electrical discharge machine under different cutting conditions, as recited in claim 1.

The Sawada patent teaches an electrical discharge machine, but includes no suggestion of constructing multiple discharge curves based on input gap-voltage deviations and cutting speed records obtained by running the electrical discharge machine under different cutting conditions, and storing the curves in a database for retrieval as necessary based on changes in cutting conditions during a manufacturing run.

The Shimomura patent does not make up for the deficiencies of Sawada. Not only does the Shimomura patent fail to teach control of an electrical discharge machine, but the numerical control taught by Shimomura involves simulation of an article to be machined, and not the claimed gap voltage and cutting speed control obtained during previous runs of the machine

under different conditions. The computer simulation carried out by Shimomura does not correspond to the claimed curve construction using data collected from previous machining runs under different cutting conditions.

Instead of selecting appropriate pre-stored discharge servo curves and swapping them for existing curves during a cutting operation, as claimed, the Shimomura method and device constructs a set of curves by simulating the article to be machined. Basically, the method of Shimomura operates as follows:

1. Input geometric data representing a shape of the article;
2. Divide into data sets;
3. Generate respective curves;
4. Unify the curves.

These steps are performed after an article to be machined has been selected, ***and the resulting curve set is not swapped during machining, based on actual conditions***, much less swapping preset curves constructed, as claimed, by “by inputting **gap-voltage deviation and cutting speed records** obtained under different cutting conditions.” Whereas the claimed invention uses a database that is built on data obtained during manufacturing of a component, but using the electrical discharge machine to be controlled, the method of Shimomura involves computer simulation of a layer cutting process to build a set of controls according to a size and shape of the workpiece.

The Examiner will note that, according to the method of Shimomura, the choice of cutter depends on the data resulting from the computer simulation, whereas the claimed invention accounts for different cutters during the curve construction and database building step and therefore is not limited to a particular cutter. Since the database is built during the actual manufacturing process, *i.e.*, under “different cutting conditions” as claimed, the CNC controller can provide appropriate discharge-servo curves *during the actual discharge process* without running an extra computer simulation as the method of Shimomura requires. In the method of Shimomura, if extra computer simulations are to be run because of changes in cutting conditions,

Serial Number 09/987,302

then multiple computers are needed to run multiple simulations. On the other hand, the claimed method and system simply needs to "swap" curves already pre-stored in the database.

As a result, it is respectfully submitted that it would not have been obvious to modify the electrical discharge machine of Sawada to use the curve generating method of Shimomura, and that the result would not have been the claimed invention. Withdrawal of the rejection of claims 1-4 and 7 under 35 USC §103(a) is therefore requested.

Having thus overcome the sole rejection made in the Official Action, withdrawal of the rejections and expedited passage of the application to issue is requested.

Respectfully submitted,

BACON & THOMAS, PLLC

A handwritten signature in black ink, appearing to read 'B. Urcia', with a long horizontal line extending to the right.

By: BENJAMIN E. URCIA
Registration No. 33,805

Date: April 12, 2005

BACON & THOMAS, PLLC
625 Slaters Lane, 4th Floor
Alexandria, Virginia 22314

Telephone: (703) 683-0500

NWB:S:\Producer\ba\Pending I...PLU\LU 987302a02.wpd